

## **In the Specification**

***Kindly replace paragraphs [0001] through [0004] with the following:***

### **Related Application**

This is a §371 of International Application No. PCT/JP2005/002147, with an international filing date of February 14, 2005 (WO 2005/085397 A1, published September 15, 2005), which is based on Japanese Patent Application No. 2004-059731, filed March 3, 2004.

### **Technical Field**

The invention relates to a biomass gasification system and operating method thereof which suppresses the generation of hindrances originating in the tar component within a fuel gas and which makes effective thermal use of a tar-containing fuel gas.

### **Related Art**~~Background~~

A known biomass gasification system generates fuel gas through a process by which biomass such as wood chips or poultry manure is thermally cracked in a non-oxidizing environment of a gasification furnace at temperatures from 600°C to 900°C. This system gasifies the combustible organic component of the biomass within a temperature range from 200°C to 600°C. The fuel gas thus obtained is sent through a supply system to an electrical generating system equipped with a combustion engine, gas engine, fuel cell and so on. This type of biomass-based electrical generating system has been looked upon with increasing interest recently.

Fuel gas generated by a gasification furnace contains a tar component made up of a high polymer hydrocarbon. The tar component, while in a gaseous state at temperatures above 350°C, coagulates at lower temperatures which results in the problems of the tar adhering to internal components and blocking passages. ~~The applicant has previously submitted a Japanese patent application (Japanese Patent Application No. 2003-292568) for~~ discloses a fuel gas quality

improvement device which is installed to a biomass gasification system and eliminates the problems caused by the tar component in a fuel gas. This device includes a porous thermal storage body, through which the fuel gas flows, connected to a fuel gas passage, the porous thermal storage body being maintained at a temperature of more than 1,100°C. Heating the tar component to a temperature greater than 1,100°C induces a thermal cracking reaction which eliminates the tar component. The aforesaid fuel gas quality improvement device employs a process temperature greater than 1,110°C through the addition of pure oxygen or air to the fuel gas so as to induce an oxidation reaction which raises the fuel gas temperature.

#### ~~Disclosure of the Invention~~

#### ~~Shortcomings Resolved by the Invention~~

The temperature of the fuel gas supplied by the gasification furnace is approximately 600°C. A considerable amount of time is required to raise this temperature to the process temperature of 1,100°C through an oxidation reaction induced by the addition of oxygen only, thus making it impossible to remove the tar component during the rise time to process temperature. More specifically, the temperature of the fuel gas quality improvement device is equivalent to that of the fuel gas when the initial generation of fuel gas occurs after the biomass first enters the gasification furnace. Therefore, the tar component cannot be thermally cracked during the time required for the fuel gas quality improvement device to reach the process temperature.

***Kindly replace paragraphs [0006] through [0007] with the following:***

#### Summary

This invention relates to a biomass gasification system including a gasification furnace which generates a fuel gas from biomass, a reforming device which attains a process temperature at which a tar component within the fuel gas is thermally cracked, connected to a supply system which feeds

fuel gas from the gasification furnace to a utilization system, and a fuel gas induction system that feeds the fuel gas from the reforming device to the gasification furnace as fuel to power operation of the gasification furnace during a time when the reforming device has not yet attained a process temperature.

This invention also relates to a biomass gasification system operating method including directing fuel gas from a reforming device, within which temperature of the fuel gas is increased to a point at which a tar component within the fuel gas generated from biomass in a gasification furnace is thermally cracked, to the gasification furnace as fuel to be combusted by the gasification furnace during a time when the temperature of the reforming device is below a process temperature.

#### Brief Description of the Drawing

Fig. 1 is a schematic drawing describing a preferred embodiment of the biomass gasification system of this invention.

#### Detailed Description

~~After thorough consideration of the aforesaid problems, the inventor of the present invention, in order to resolve the previously noted problems relating to the tar component in a fuel gas, puts forth~~  
We provide a biomass gasification system and operating method thereof capable of preventing tar component obstacles from the system and thermally utilizing fuel gas containing the tar component.

#### ~~Means of Overcoming Shortcomings in the Related Art~~

The biomass gasification system ~~specified by the invention~~ comprises[[:]]:

a gasification furnace which generates a fuel gas from biomass;

a reforming device which attains a process temperature at which the tar component within the fuel gas is thermally cracked, the reforming device being installed to a supply

system which supplies fuel gas from the gasification furnace to a utilization system; and

a fuel gas induction system which feeds the fuel gas from the reforming device to the gasification furnace for use as fuel to power the operation of the gasification furnace during the time when the reforming device has not yet reached the process temperature.

***Kindly replace paragraph [0009] with the following:***

Furthermore, the operating method ~~of the biomass gasification system invention~~ includes a step of directing fuel gas, which has been generated from biomass in a gasification furnace, from a reforming device within which the temperature of the fuel gas is increased to a point at which tar component within the fuel gas may be thermally cracked, to the gasification furnace for use as fuel therein during the time when the temperature of the reforming device is below the process temperature.

***Kindly replace paragraphs [0011] through [0012] with the following:***

#### **~~Effect of the Invention~~**

The biomass gasification system and operating method ~~invention~~ prevent hindrances caused by the tar component within a fuel gas and also makes effective thermal use of a fuel gas containing a tar component.

#### **~~Preferred Embodiments of the Invention~~**

The following will describe ~~a preferred embodiment~~ one example of ~~the~~ a biomass gasification system and operating method ~~invention~~ with reference to the attached drawing[[s]]. The basic configuration of the embodied biomass gasification system can be seen in Fig. 1 which describes

a gasification furnace 1 which generates fuel gas from biomass;

a reforming device, in the form of a gas reforming tower 4, which is installed to a supply system 3 through which fuel gas from the gasification furnace 1 is fed to a utilization

system 2, gas reforming tower 4 being capable of raising the temperature of the fuel gas to a process temperature at which the tar component within the fuel gas may be thermally cracked; and

a fuel gas induction system 5 through which fuel gas from the gas reforming tower 4 is supplied to the gasification furnace 1 for use as fuel gas therein during the time when the gas reforming tower 4 has not yet attained the process temperature.

***Kindly replace paragraph [0020] with the following:***

The following will describe the operating method of the biomass gasification system ~~invention~~. When the biomass gasification system begins operation, the temperature within the gas reforming tower 4 during the temperature rise time is lower than the process temperature at which the tar component may be removed from the fuel gas. The temperature in the gas reforming tower 4 is monitored by the thermal sensor 24, and a signal relating to the aforesaid temperature is output to the control unit 25.

***Kindly delete paragraph [0031].***